

APGAR, A.C

1880

A Key to the Mollusca



Zool. (Mollusc.)
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K-1-a APG.

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A KEY
to the
MOLLUSCA,
given in
VERRILL'S SYSTEMATIC CATALOGUE,
of the
INVERTEBRATES,
of
SOUTHERN NEW ENGLAND,
and the
ADJACENT WATERS.

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PREFACE

As far as the author knows this is the first key of any of the mollusks of the United States published.

He claims originality only in the key portion, and in the arrangement of that key so as to show the classification of the species into orders and families at each step. He has made use of all the works at his command in the wording of his descriptions.

He hopes that it will enable any one to trace any good specimen, that is moderately mature.

The dimensions are all given in mm and refer to mature specimens.

The figures on page 8, the figs. 1 & 2 page 2, and 3 page 28, are from Sea Fisheries of the Coast of New England. Figs. 2-6 page 27 are from Binney's and Invertebrates of Mass. Fig. 1 page 28 are from Morse's First in Zoology. Figs. 1 & 2 page 2 are original.

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594.0973

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Moll.

8.

CONTENTS,

The derivation of the names are given in parenthesis.

Key to the classes of Mollusca (L. mollis, sort)	7.
Cephalopoda (G. kephale, head; pous, foot)	9.
Dibranchiata (G. dis, twice; brachia, gill)	9.
Gasteropoda (G. gaster, stomach; pous, foot)	13.
Prosobranchiata (G. proson, in advance of heart; brachia, gill)	13.
Packinibranchiata (L. packen, comb; brachia, gill)	13.
Docoglossa.	21.
Polyplacophora (G. polus, many; plax, plate)	21.
Upisobranchiata (G. opis, then, behind heart; brachia, gill)	21.
Tectibranchiata (L. tectus, covered; G. brachia, gill)	21.
Nudibranchiata (L. nudus, naked; G. brachia, gill)	23.
Abranchiata (G. a, without; brachia, gill)	23.
Pulmonata (L. pulmo, lung)	22.
Inoberculata (L. in, without; operculum, lid)	22.
Pteropoda (G. pteron, wing; pous, foot)	26.
Gymnosomata (G. gymnos, naked; soma, body)	26.
Thecosomata (G. theke, sheath; soma, body)	26.
Lamellibranchiata (L. lamella, plate; G. gill)	29.
Siphonata (G. siphon, tube)	30.
Asiphonata (G. a, without; siphon, tube)	43.

MOLLUSCA.

Soft bodied, unsegmented animals often protected by a shell; the digestive system includes stomach, intestine and anus; the nervous system generally consists of three pairs of ganglia, but in Trachicypoda, Tunicata and Polyzoa there is only one ganglion.

The heart has two or more chambers, but in the Tunicata it is reduced to a simple tube, and the Polyzoa have no hearts.

The integument of the body, continuous or divided into two lobes, is called the mantle. The mantle secretes the shell which is rarely absent.

In the mouth of the Pteropoda, Gastropoda and the Cephalopoda there is an organ armed with a ribbon of teeth; this is the radula, erroneously called tongue.

I Animal with a shell; simple.

A Shell univalve.

1 Shell divided across into several chambers, curved into a spiral the curves separated. (Only one example to the section covered by this work.)

Class Cephalopoda, Fam. Nautilidae

Page 10.

2. Shell undivided, usually spirally operculated; animal with a distinct muscular foot for locomotion.

Class Gastropoda

Page 13.

3. Shell annular like a village, pen like in form; animal with 8-10 arms, broad head provided with

MOLLYSCA.

Cap. like suckers; eyes large.

Class Cephalopoda. Page 10.

1. Shell thin straight, conical or spiral; animal with wing or fin like expansions on the sides of head or neck by which it swims freely in the ocean.

Class Pteropoda, ~~Order~~ Thecosomata. Page 10.

B Shell bivalve.

1. Shell exactly equilateral, but unequal valves, one above and the other below the animal, no branchia; mouth with two long cirriferous arms. (See example in the region)

Class Brachiopoda.

2. Shell never exactly equilateral, usually equivalve, sometimes unequal valves, usually provided with a hinge; if not with hinge then often provided with necessary valves.

Class Lamellibranchiata.

Page 28.

C Shell multivalve.

Composed of eight transverse imbricated plates; animal with thick creeping foot.

Class Gasteropoda, ~~Order~~ Polypl. ~~Order~~ Page 31.

II Animal with a shell; compound.

Shell in compound fixed minute animals provided with tentacles around mouth.

Class Polyzoa.

MOLLUSCA.

III Animal without a shell; Simple

A Free swimming animals with distinct head and provided with two wing or fin like expansions attached to the sides of the neck.

Class Pteropoda, Order Gymnocranota.

B Animal with head and provided with a large locomotive disk or foot, some provided with wing like expansions, but these are attached to the sides of the body by their inner edge. (Sea slugs)

Class Gastropoda, Order Cephalopoda.

C Headless, transparent, jelly like, free swimming animals, with simple ribbon shaped branchia. Solitary generation of

Class Tunicata, Order Biphora.

D Fixed animals provided with a leathery elastic integument, having two prominent apertures. (Simple and double)

Class Tunicata, Fam. Ascididae.

IV Animal without a shell; Compound

A Headless, transparent, jelly like, free swimming animals with simple ribbon shaped branchia, connected together in a double row. Solitary generation of

Class Tunicata, Order Biphora.

B Fixed animals protected by a leathery or jelly like skin having two apertures for each individual, or in many cases an oral aperture for

MOLLUSCA.

7

each individual and an atrial sac for a distinct group of them. Animal without the power to project any part beyond the enveloping sac.

Class Tunicata, Order Ascidioida

Page

C Compound fixed animals, each living in a cell of a plant like organism; cells not in communication; animals provided with a row of tentacles around mouth; the alimentary canal suspended in a double walled sack. The investing membrane is corneous or fleshy and usually highly charged with carbonate of lime

Class Polyzoa.

CEPHALOPODA.



Loligo pallida $\frac{1}{3}$ nat. size.



Pen of
L. pallida
 $\frac{1}{2}$ nat. size.

CEPHALOPODA.

Free swimming oceanic mollusks with a distinct head and long arms placed around the mouth. Eyes large and much like those of vertebrates.

Arms eight in ten, all furnished with suckers, with or without an external shell.

If the external shell, but with an indurated straight covering, cartilage which extends the whole length of the body; bivalvent with an ink bag.

Laterals large with three ribs, one central and two marginal;

Finchlike posterior caudal, eyes with lid and a much on upper side.

Color vivid and beautiful, passing from a brilliant red to a deep orange blue upon the back, the region of the eyes finely tinted with yellow; length from base of arms 150.

Oncostrophus illecebrosus.

If internal yew, pinnate with thin edges; finchlike posterior dorsal; yet smotherly covered with the thin membrane.

Caudal fin about as broad as long; lateral fin hardly at all rounded; cephalic arms as long as the body, when extended. Length from base of arms 150, body 100, caudal fin 70, with 70. Cephalic arms 150. General appearance pale yellowish, translucent, not very thickly covered with spots.

Calliope pallida.

18
CEPHALOPODA.

lateral angles of caudal fin quite rounded; darker colored and thickly covered with spots.

Loligo pealii.

II No external shell, but with an internal coiled chambered shell which is calcareous and is coiled in the plane.

Shell white and pearly and coiled up in two or three turns which do not touch each other like a ram's horn; thrown up after storms on the shores of Nantucket.


Spirula fragilis

GASTEROPODA

13

Gastropoda. Land or water mollusks generally enclosed in a univalve shell. Locomotion effected by the ventral disk or foot. A distinct head in nearly all, with one or two pairs of tentacles. Dioecious or hermaphrodite. Eyes two or none.

Note, — wh = whorls, ap = aperture. Nos. representing distances are all in m.m. At the end of the descriptions of snails the Nos. are for length, width, angle of spire, No. of whorls, and ratio of aperture to length of shell.

1 Shell spiral; whorls together; dextral, ; operculated.

A Margin of shell ap. notched or produced into a canal.



2 Shell with a decidedly produced anterior canal; ap. entire posteriorly; foot broad. — Shell large; canal more than 30 long; ap. longer than spire.

Spire with a broad deep channel at suture; 100, 80, 90, 6, $\frac{3}{4}$. *Succinea canaliculatum*.

A series of tubercles around the wh. of spire. 120, 75, 85, 6, $\frac{1}{2}$. *Pulmonaria*.

3 Shell medium; ap. about the spire. Canal more than 15 long, gently curved; ap. polished white within. 70, 27, 50, 8, $\frac{1}{2}$.

Neptunea curta.

4 Spire without rib like undulations; canal 5 long; disk woolly or velvety ap. entire. 20, 11, 35, 6, $\frac{3}{4}$.

Neptunea pugna.

5 Spire with 10-12 rib like undulations; wh. rounded; 35, 14, 45, 5, $\frac{1}{2}$. *Urosalpinx cinerea*.

6 Spire with 6-7 equidistant thread like revol. lines; ap. within bright reddish brown. 14, 7, 15, 4, $\frac{1}{2}$.

Psychatrus ligatus.

7 Spire conical and pointed at the crossing of the 11 elevated ribs; canal slender. 25, 14, 60, 3, $\frac{1}{2}$.

Eupleura caudata.

8 Canal not much produced; ap. notched; $\frac{2}{5}$ or more inner lip without tooth or callosity. More than 24 long.

2-1-1944 (Sunday) 08:45 AM

1952-1953

1920

1890

Helix glaucocephala

11. a. *masa obel-ta*.

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

GASTEROPODA

H. G. F.

Body wh. with 12 rib like folds and crossed by 10 or more elevated revolving threads rendering the ribs nodulose; spire with ribs and revolving lines distinct; suture not distinct. 6, 3, 40, 6, $\frac{7}{16}$. *Belaplicata*.
 Closely covered with almost microscopic revolving lines; outer lip sharp, slightly overted, smooth within; suture faintly impressed but distinct; white tinged with rose. 7, 4, 35, 6, $\frac{7}{16}$. *Astyris rosacea*.
 One revolving line below suture, 2. rid around beak; reddish-brown with crescent shaped yellowish spots on body wh.

5, 25, 43, 6, $\frac{1}{3}$. *Astyris lunata*.

No revolving lines on beak, slightly striated longitudinally. 5, 25, 43, 5, $\frac{1}{3}$. *Astyris zonalis*.

Two revolving ridges with distinct groove between around the wh. 8, 4, 40, 6, $\frac{3}{16}$.

Pleurokoma bicarinata.

Suture distinct but shallow, undulated; body wh. with about 11 prominent longitudinal ribs separated by wide concave spaces; wh. angulated at the middle and decidedly flattened below suture. 6.5, 3, 44, 6, $\frac{1}{16}$.

Mangelia curina

Shell turreted, 15 or less long; ap. $\frac{1}{4}$ or less of the length of the shell.

Canal deep, short, slightly curved.

Reddish black; 3 series of granules on the lower wh. caused by 3 revolving lines and about 20 ridges; ap. nearly circular. 12, 3, 20, 16, $\frac{1}{16}$.

Cerithiopsis greenii.

Regularly granulated surface; suture abruptly and sharply defined, wh. flattened; beak short, twisted, wrinkled. 12, 3, 20, 16, $\frac{1}{16}$.

Cerithiopsis emmonsi.

Regularly ridged surface like the throat of a screw, 3 around the lower wh. wh. flattened and striated. 12, 3, 16, 11, $\frac{1}{16}$.

Cerithiopsis terebralis.

Canal a more oblique fissure or notch.

Six revolving lines and 20 ribs on the two lower wh. making a granular network over the

EASTERBODA.

surface 7, 2, 25, 1, 1/4 *Bittium wigham.*

13 Margin of shell ap. entire

1. Shell globular or few wh. with a small spine; outer lip acute, umbilicus distinct, either free or covered by callus, ap. 5 or more.

Apparent growth distinct; but

well marked; umbilicus large and simple

6. E. 100, (203) *Lunatia heros*

Many young specimens are found and collected from the *Penicillium* series 11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1

Chilodactylus affinis was recorded in the Pacific off the coast of Japan (Fukushima, 1924, p. 5).

Amorpha fruticosa

rates of growth (rate) are not improved with mobile, sessile, or ambilious frond.

8. *Lonchocarpus* *Lonchocarpus*

and lies deeply crossed, and partially or
entirely covered with a chestnut colored

cell wall which extends indirectly along the

James H. Hays, U.S. Marshall, Toledo

with the collar along the inner lig. and passed
into the nostrils, nearly filling the nostril.

Native psychology

2. Small top shaped or ovoid (one species nearly spherical), air-translucent, opaque, or more usually, grey, green or very slight water lily shape, more or less flattened.

toad warts; plain reddish tint and orange
toad warts; small; apically broad body.

pharynx is broadly blackish, and the
throat is blackish, and the throat is blackish.

1901. Yellow: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Littorina saxatilis

alabaster, white, smooth, shining, like small
drops of wax, white, yellow, orange, red, black

and finally, usually, as a single color but often
faded or spotted, dorsal head changes, and

work and according to variable conditions
 determining problems.
 Central-organ; surface not indicated; numerous
 existing elements, but in general they are
 small and rich.

1940

- Rhipidoglossa* 3 Conical; ap. circular, pearly within
Umbilicus large and deep; wh. convex and
rendered angular by a prominent revol-
ving ridge; lip simple sharp; operculum
horny nucleus central, 12, 9, 95, 5, $\frac{2}{3}$.
Margarita obscura.
- 4 Globose or conical, thin; ap. semi-lunar;
inner lip oblique; outer lip sharp flattened;
umbilicus a lengthened groove along the
pillar
Ovate-conic; wh. encircled by 4-5 purplish
brown bands and numerous minute
undulating lines; suture fine deep; ov.
nearly orbicular; inner lip white, flattened
and excavated by a smooth, crescent shap-
ped groove terminating in an umbilicus
13, 8, 50, 5, $\frac{1}{2}$ *Lacuna vineta*
Globular-ovate; ap. semi-lunar, oblique; um-
bilicus large and deep. 5, 6, 95, $\frac{3}{2}$, $\frac{3}{4}$.
Lacuna neritoidea.
- 5 Ap. $\frac{1}{3}$ the length of the shell; ovate-conic; spine
obtus. at top; suture distinct; wh. 5-6; umbilical
chink.
Usually coated with a dark green pigment or
minute vegetable; animal blackish; thin; common
in sea weed about high water mark
4, 25, 5, 5, $\frac{1}{3}$ *Littoronella minu'*
Wh. convex, covered with regular microscopic lines
revolving around the shell; suture deep; light
yellow horn color; ap. oblique, ovate, angular to
hind. 4, 17, 25, 6, $\frac{1}{3}$. *Rissoa aculeus*.
Wh. convex; 3 revolving lines on upper whorls;
ap. ovate; fuscous. 27, 12, 20, 5, $\frac{1}{3}$. *Rissoa exarata*.
- 6 Turreted shells, 3 or more times the length
of the ap.
— Wh. crossed by very distinct elevated ribs;
ap. ovate, the margin entirely united; lip
continuous, reflected; umbilicus none.
16-18 delicate ribs, not crossing the suture,
no revolving lines between; white.
12, 5, 30, 8, $\frac{1}{5}$. *Scalaxia lineata*.
14-20 ribs, with the spaces between
marked with numerous revolving lines;
white. 12, 5, 30, 8, $\frac{1}{5}$. *Scalaxia multistriata*.

ASTEROPODA.

1 1/2 stout, flattened, oblique white ribs; intervening spaces marked by 6-8 coarse, equidistant revolving ridges; ap. nearly round bordered by a rib; bluish-white. 24, 10, 12, 10. 1/4

Scalaria granlandica.

Wh. without decidedly elevated longitudinal ridges;

1. Umella plaited; ap. ovate; lips disunited posteriorly; pillar with a tooth like fold; operculum horny; tip of spire usually obtuse; less than 2 long. Genus *Odostomia*.

Shell thin and horny; suture distinct.

Lip decidedly blunt; wh. flattish; umbilicus none; 6, 17, 15, 8, 1/4. *O. producta*.

Lip bluntish; sub-umbilicated; sometimes seemingly double by a ridge; tooth like fold of pillar sometimes well within the shell. 6, 14, 25, 6, 1/4. *O. fusca*.

Ivory white, rather solid.

Suture well defined; wh. convex; pellucid. 5, 16, 23, 6, 1/4. *O. dealbata*.

Suture slightly but sharply depressed, in which there are about 5 revolving lines of which one above and two below are most distinct; ap. usually angular above. 6, 2, 23, 8, 2/7. *O. trifida*.

Glossy, translucent; wh. convex with numerous ridges or folds crossed by three equidistant revolving lines giving the surface a g. nateca appearance except lower half of body wh. which has revolving lines only. 4, 18, 30, 6, 1/3. *O. seminuda*.

> Dusky or greenish.

Dusky; 4 ac. 2 impressed revolving lines; acute at apex. 5, 2, 22, 6, 1/7. *O. impressa*. Surface light green under a brownish epidermis; lower wh. 1/2 length of shell; pillar tip bluish white; outer lip sharp simple; umbilical chink; revolving line below suture whitish. 5, 25, 25, 5, 1/4. *O. flavatula*.



GASTEROPODA.

†† Columella straight, simple, without plait; aperture oblong, sub-quadrate or ovate

Reversed wh. at the apex. *G. Turbonilla*

Wh. slightly convex; 25 ribs; 14 revolving lines looking like 7 because they are in pairs; suture well defined.

6, 25, 12, 4, 1/4.

T. interrupta.

Wh. well rounded; suture rather deep; numerous ribs not so broad as the interspaces; about 5 revolving lines on the upper whorls, interrupted on the ribs. 5, 15, 20, 10, 1/4. *T. elegans.*

Wh. moderately convex, flattened in the middle; 25 ribs on lower wh. 6 revolving lines on the upper whorls which do not cross the ribs; apical wh. minute; shell obelisk shaped. 4, 15, 20, 8, 1/4. *T. arcolata.*

Large smooth reversed apical wh.; wh. slightly convex, flattened; 20 ribs on lower wh.; revolving lines very minute numerous; body wh. with two bands of pale brown. 4, 15, 22, 6, 1/4. *T. costulata.*

Reversed wh. minute; white; very acute; 16-18 ribs on lower wh.; 2 upper wh. nearly smooth. 4.5, 1, 15, 10, 1/4. *T. stricta.*

20 ribs on body wh., interstices deep and apparently smooth; ap. round-ovate. 4.5, 12.5, 18, 10, 1/4. *T. equalis.*


††† Apex acute; animal and shell white; suture inconspicuous; wh. flattened marked with light brown transverse bands; variable shell white shining; animal hyaline.

6, 15, 20, 12, 1/4.

Eulima olacea.

7 Shell discoidal; ap. dilated; concave; umbilicated beneath; all the wh. seen from the under side. 1, 13, 14, 3, 7/3. *Skenea planorbis.*

Cerithiada

II Shell spiral; wh. together. Sinistral, ; operculated.

Turretted, granulated. 5, 12, 23, 12, 1/7.

Triforis nigrocinctus.

Thin, transparent, ovate-globose, 2.5, 2, 60, 7, 1/2.

See No. 2. Page 27.

GASTEROPODA.

III Shell spiral; wh. separated operculated.

Shell conic tubular; unequal striae run the length of the tube; spiral portion 15 long, the rest continued indefinitely, sometimes 200 long; diameter of ap. 6.

Vermetus radicle

IV Shell tubular, merely curved, very minute; operculated.

About 25 strong encircling ribs. l. 2.5; dia. .6,
Cœcum pulchellum.

Ridged lengthwise of the shell. l. 2.5 dia. .6.
Cœcum cooperi.

V Shell not apparently spiral but flat or concave.

1 With an internal, usually horizontal partition or diaphragm.

Oblique-convex oval, partition appressed to one side; apex prominent turned to one side; convexity moderate but different according to the object on which it adheres; common, l. 35, w. 25. diaphragm $\frac{1}{2}$ of ap. *Crepidula fornicata.*

Ovate flat; apex acute, terminal; diaphragm convex; found inside shells. l. 30, w. 22.

Crepidula plana.

Shell very convex; apex terminal separated from body of shell; diaphragm convex, less than $\frac{1}{2}$ of ap.; inside brown except edge of diaphragm. l. 11, w. 65. *Crepidula convexa.*

Shell sub-conic, oval; apex central; numerous radiating lines; diaphragm triangular fastened by one side, the free point nearly corresponds with the inner apex of the shell. l. 22, h. 18. *Crucibulum striatum.*

2 Without internal partition.

Shell basin shaped, oblong, oval, thin; apex obtuse; surface finely checkered with

NASTENOPODA.

alveus

growth other

2.12 w.7.

Trachydermon ruber

Cylindrina alba

Cylindrina cryza

Bulla solitaria

Amphisphæra debilis

Utriculus

canaliculatus

GASTROPODA.

127 68 $5\frac{3}{4}$ *Melampus bidentatus*

VIII Animal without gills,
branchiae tufted, mostly spread,
sometimes concealed by the edge
of the foot (see fig. 2) length with

1 Animal apparently without branchiae,
body smooth, oval, convex, dorsal border
of a depression without deeply, deep
prominent with lateral angles, prolonged
into short cone (tentacles) foot broad
spade; branchiae tufted near the posterior
end on right side in groove between mantle
and foot; dark brown above, white beneath.
7.5, 5. *Deridella obscura*.

2 Branchiae unbranched, club form, a single
line on each side of the body.

Slender, gradually tapering backwards,
convex above; feet as wide as body; ten-
tacles thread like; branchiae 1-1 on each
side, pale rose color dotted with dark brown.
11, 11. *Doto coronata*.

Lance-linear, colorless with a zigzag
olive-colored stripe, along back connecting
the obovate branchiae, 4-1 on each side
dorsal tentacles long, simple, blunt,

GASTEROPODA.

oral ones short pellucid; tail pointed 6, 1.
Tergipes despectus, linear; branchiae 7 large and 8-10 small ones on each side, the large ones are much enlarged near the end, and with the internal dark parts look like crosses.

Hermæa cruciata
 3 Branchiae simple unbranched, situated in double oblique cross lines on each side of body, club shaped.

Lanceolate, widest $\frac{1}{3}$ from head; drab color, back with a carmine line margined with silvery dots between tentacles and each tuft of branchiae; tail pointed, silvery; branchiae in 5-7 double rows on each side. 36, 6.

Montagna pilata, lanceolate; dorsal tentacles longer than oral ones; light yellow tinged with pale orange; branchiae 5 double rows on each side about. 24, 3.

Montagna gouldii, lanceolate tapering to a point; head rounded; oral tentacles longer than dorsal ones; branchiae about 6 double rows on each side, about 12 in each front double row. 12, 15.

Montagna vermitera.
 4 Branchiae unbranched, situated in very many oblique rows, or in irregular clusters on each side.

Triangular, broad in front; branchiae oblanceolate, 200-400 in number arranged in 15-24 oblique rows on each side; great variation in size and color from flesh-color to dark olive and brown much mottled. 15, 26.

Aeolis papillosa, lance-linear; watery white; branchiae club formed in 7 clusters of about 5 each on each side; back exposed. 12, 2. *Caryphella gymnotus*.

5 Branchiae branching bipinnate, arranged in a circle or crown in the centre of the back. ovate-oblong, widest about $\frac{1}{3}$ from head;

GASTEROPODA.

Back very convex; mantle scattered over with fine papillae; mantle does not cover back end of foot, branchial crown of plumes $\frac{1}{4}$ from head, retractile into a single cavity; tentacles long, outer half plicated with 2 cross folds, tip smooth, base surrounded with papillae; feet purple, notched with white and bright yellow, the crown of branchiae is covered over with bright golden specks. 25, 12.

Doris litida.

Body oblong, ends equally rounded; back covered with large cream colored mushroom like tubercles; wreath of about 7 once pinnate plumes retractile into separate sheaths. 12, 6.

Enchidori, pallida.

Outline oblong-linear; back arched, apex about centre, a sharp ridge or narrow fringe along the sides of the back with 6 tubercles on each side; 2 large and 2 small bifinnate branchial plumes forming part of circle about $\frac{1}{4}$ from head head nearly circular; yellowish green with tubercles tipped with sulphur yellow. 15, 6.

Polycera lessonae.

6 Branchiae in arborescent much branching forms, situated in a single line along each side of back.

Elongated, tapering, rounded above as high as broad; branchiae but more pairs translucent; color very variable, pale rose to dark brown mottled and marbled. 60, 15.

Dendronotus

arborescens.

IX Animal without shell; no branchiae; breathing through the entire surface of the body; sides of body dilated into wing like swimming appendages, which are folded on the back while crawling.

GASTEROPODA.

Swimming appendages when on the back lapping over each other; ~~emerald~~ green with white and red spots. 25, 1 according to position of appendages.

Elysia chlorotica.

Membranous expansion not meeting on the back; head rounded, globose; tentacles short, blunt, broad; foot square in front, pointed behind; sea green with whitish spots.

6, 25,

Elysiella catulula.

1861.
Abbeville
Cristobal Colon
Elysia

PTEROPODA.

1. Head, stalky, in a very long spine with
with a short spine on each side.

Diactis trispinosa.

Shell globular, posterior end pointed,
each side with an outward curving
process like process extending
back beyond the tail; wings somewhat
obovate triangular, with the ends three
lobed; length 1/2 inch of tail 1/2, to end
of processes 1/2, width 1/2.

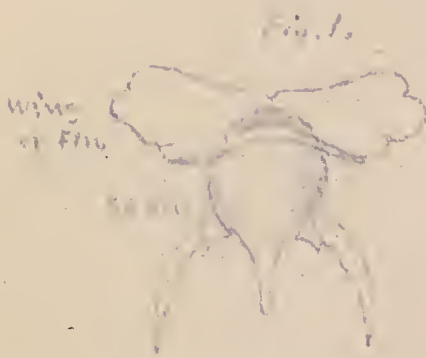
Carolina tridentata.

2. Shell minute, spiral, operculate.

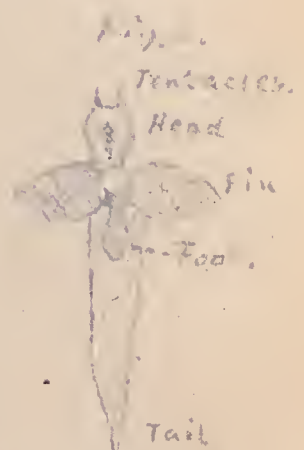
Unistrata; length 1/2 inch 2.

Asperata, where it is figured.

Spiralis gouldii.



Carolina tridentata,
natural size.



Clione papillosa;
natural size.



Styliola vitrea; natural size.

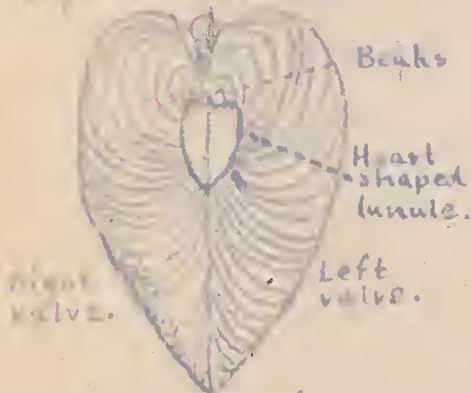
LAMELLIBRANCHIATA.

Fig. 1.



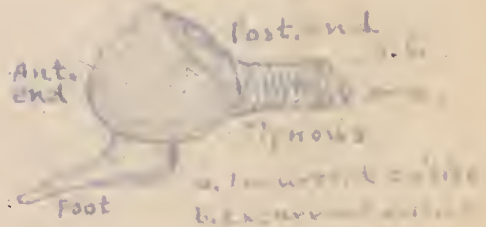
Inside of Right Valve of *Venus mercenaria*.

Fig. 2. Fragment



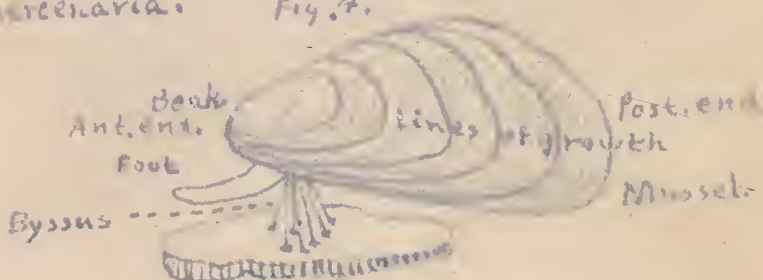
Anterior end of *Venus mercenaria*.

Fig. 3.



Animal and shell of *Mulina lateralis*, natural size.

Fig. 4.



LA MELLIBRANCHIATA

Lamellibranchiata. Headless mollusks encased in a bivalve shell, sometimes with accessory valves. Body enclosed within a mantle. Respiratory organs consisting of lamelliform or filamentous branchia. Sexes distinct.

The shell though usually equivalve is often inequivalve, but always inequilateral, with usually two but sometimes one adductor muscle for closing the valves.

The shell if hinged is opened by either a ligament outside, or a cartilage inside, or both.

Locomotion is very imperfect in the adult state; many are permanently fixed, either by their shells, or by a peculiar secretion one form of which is known as the byssus, or they bury themselves in the sand, or bore into timber or rocks.

Note.—r.v. = right valve; l.v. = left valve; ant. = anterior, post = posterior, c.t. = cardinal teeth. Numbers representing distance are all in m.m. At the end of the descriptions they are for length in front of beak + length behind beak, height (distance across from hinge to the other edge), breadth (distance from outside of one valve to outside of other), and, if the fifth No. is given, it represents the angle formed by line joining the beak and the slopes of the shell.

I Shell gaping more or less at the ends.

A Without hinge or ligament often with accessory valves. Animal club shaped or worm like, with short truncated foot; siphons long united to near their tip.

LAMELLIBRANCHIATA.

1 Valves equal, largely open at both ends, forming a ring, placed at the larger extremity of a shelly tube open at both ends, and furnished with pallets.

posterior auricle extends down $\frac{3}{5}$; the ant. triangle

Ant. tri.



Post. au.

$\frac{1}{3}$; pallets emarginate at tip, convex on one side and plain on the other; stalk about as long as the blade (common ship-worm boring in timber).

Valves 5, 5, 5; pallets 5, 14; stalk $\frac{3}{7}$ of length.

Teredo navalis.

Post. auricle extends a little higher than beak and separated by a narrow notch and extends down $\frac{3}{3}$; ant. triangle $\frac{1}{3}$ with 20-30 radiating grooves; pallets small ovate rounded or slightly emarginate; stalk pointed. 6, 6, 6; 4, 16; — $\frac{1}{3}$.

Teredo megotara.

Post. au. and ant. tri. both extend down $\frac{1}{3}$; post. au. does not extend up quite as high as beak; pallets battledore like 6, 8, 8; — 1, 1; — $\frac{1}{2}$ *Teredo thomsonii*.

Post. au. rounded not extending above beak but down $\frac{2}{3}$; ant. tri. $\frac{1}{2}$; pallets small angular obovate blunt.

10, 9, 9; — 6, 24; — $\frac{1}{2}$ *Teredo dilatata*.

Post. au. rounded does not extend upward but $\frac{1}{2}$ and downward $\frac{2}{3}$; ant. tri. $\frac{1}{3}$ pallets oar shaped, blade oblong feathered serrated.

6, 6, 6; — 12, 2; — $\frac{1}{2}$ *Xylotrya timbriata*.

2 Shell gaping equally at ends; a rib like process or tooth arises from the back and shoots nearly across the shell; shell large, more than 40 long; (found in wood, clay and stones which they have perforated) shell very large oblong-ovate, white, covered with radiating toothed ribs, the teeth formed by the lines of growth.

LAMELLIBRANCHIATA.

- 30 + 100, 50, 50, 180. *Pholad. californica*.
 2 Shell medium oblong, chalky white
 3 ant. end triangular acute with radiating, irregular ribs; post. broadly truncate; lines of growth distinct.
 6 28 + 33, 10, 21, 150. *Pholad. truncata*.
 8 3 Shell oblong-oval, gaping widely at ant. end.
 4 Thick and strong; ant. end with triangular ribs; post. rounded; ant. separated from post. end by an oblique broad channel
 2 35 + 35, 35, 160 *Siliqua costata*.
 1 one slight exception
 2 B Hinged, equivalently elongated. 2 or more times as long as high, sub-cylindrical, gaping more or less at both ends, with not over 3 c.t. in each valve.
 1 With external ligament
 1 Glossy, smooth, thin, with internal rib passing from beak part way across the shell, often broken off from old shells; beak less than 1/2 from ant. end; no radiating lines.
 4 Shell scabbard shaped; sides nearly parallel 2.6 times as long as wide; beak terminal; yellowish or brownish green epidermis
 7 0 + 150, 25, 20, 80, *Ensatella americana*
 1 Ovale-elliptical, fragile; beaks minute; light yellow-green epidermis, color blended with livid violaceous in such a manner as to form 2 radiating compartments of each color; rim white inclining backward about 1/3 across shell. 12 + 32, 17, 7, 160, *Siliqua costata*.
 2 Beak nearly central; sides nearly parallel, more or less curved; end merely rounded
 1 Oblong with obliquely rounded ends; thick and strong; post. end narrower; beak obtuse and slightly elevated; surface

LAMELLIBRANCHIATA.

coarsely wrinkled by the stages of growth and covered by a dense and strong epidermis which is yellowish in color and folds over the edge, pallial line with sinus which passes beyond beaks.

50+42, 32, 25, 175, *Tagelus gibbus*.

Oblong-oval arcuated; surface smooth in the central region & wrinkled at the ends, with a band of reddish purple passing from the beaks across the shell growing wider and fainter in its progress, this is visible within and covered by a faint rib like thickening; epidermis straw color.

16+16, 10, 8, 170 *Tagelus divisus*.

3 Very irregular, about toothless; lig-

ament long and strong; pallial sinus

narrow and deep; right valve a little

larger than the left; epidermis thin

dusky yellow; muscular impressions obscure;

foot of animal bright orange yellow; an

exceedingly variable rough shell found

adhering to almost all kinds of marine objects. 10+15, 14, 10, 160, *Saxicava arctica*.

4 Oblong-oval, more than twice as long

as wide, chalky white with radiating ribs

some of them with toothed scales.

Ant. end covered with elevated toothed

radiating lines; post end marked with

finer radiating lines, 2 small teeth

in each valve; distinct ovate lunule.

7+30, 19, 3, 160, *Petricola pholadiformis*.

5 Smooth shining thin more or less ir-

idescent with very fine concentric striae;

ant. dorsal margin straight or slightly

concave; post. end slopes rapidly and

is sub-truncate at end; ventral margin

nearly parallel with ant. dorsal, color

pink, light straw or white often banded concen-

trically 8+5, 7, 3, 130, *Angulus tenellus*

LAMELLIBRANCHIATA.

narrower and a little more pointed; dingy white covered by a dirty brown epidermis; spoon shaped process extending from the left valve into the right; very common. (soft clam). 43, 47, 50, 25, 160. *Mya arenaria*. Thin, fragile, pearly, translucent, sub-ovate, slightly gaping at one end, post. truncate, elongated; beaks prominent, inclined forward; process consisting of a narrow ledge within each valve; epidermis projecting beyond the edge of the shell and wrought into regular fringed wrinkles often containing grains of sand. 67, 11, 5, 165. *Lyonsia hyalina*. Small, thin, fragile, bluish white, ovate-triangular; spoon shaped process shallow, a single oblique tooth by its side in each valve; pallial line with large sinus; lines of growth shown by raised ridges; shell warped; ant. end rounded, post. more pointed. 177, 11, 5, 110. *Cummingia tellinoides*.

3 Equivalve, with extra V tooth; thick and strong. Large ovate, with dirty brown epidermis; spoon shaped cavity very large and broad, the V tooth very delicate.

40 & 65, 70, 45, 110. *Maestra solidissima*.

Small triangular; paces before and behind beaks broad heart shaped; nearly smooth shining, with a thin dirty brown epidermis; the pits are small and deep and before it is a strong V tooth. 518, 10, 5, 110.

Stalinea lateralis.

Sub-triangular; smooth and covered by a shining golden yellow epidermis; spoon shaped pit very deep; a long acute V tooth. 24 & 10, 25, 14, 120. *Ceronia acutata*.

D Hinged, equivalve, minute; tooth on the shorter side excavated for the cartilage in place of a perfect spoon shaped cavity. (late, fragile, white within and without; 2 teeth in each valve; nearly closed; beaks elevated nearly central; surface shining with a very thin straw colored epidermis; within polished but marked faintly with

LAMELLIBRANCHIATA.

Monday, 11th.

200,000,000

Alendronato 10 mg

The length of the right eye is longer than the left; the length of the right eye is longer than the left; and the length of the right eye is longer than the left.

2. Right valve flat.

Pungent, white, 1/2 inch thick, and
 slightly curved, round, pale, and
 slightly upturned at the margin,
 pink, king margin. 1/2 inch thick, and
 slightly curved, round, pale, and
 slightly upturned at the margin, 10-12 by 12-14.

Chidiophora trilineata.

2. Not very inquisitive. Small, less than 100 mm., oval to oblong, thin; outside ligament. Iridescent, very thin; ligament short and prominent; varies from white to a slight tinge of rose color; C.E. 3 to each valve. 515, 8, 3, 120. *Angulus tener*

lanceolate, smooth, shining, with a
pink or light straw color; ligament
plate long, ant. dorsal margin
nearly straight or slightly concave.
♂ + ♀, 3, 140. *Angulus tenuis*.

Varied and widely gaping; inside of
growth fine; inside polished and with
fine radiating lines; hinge delicate,
two diverging teeth on rim on each.

Right mandible, iniquitous. Rt. mand. shorter than the left; length not more than 1/2 the height; beaks conspicuous; the right one excavated to reveal the tip of the left; outside ligament large and protuberant.

Shell large, thin, light and fragile, of
a dingy white color, inside with out
teeth; interior chalky white; surface
irregular; surface coarsely wrinkled
in the lines of growth and unmarked
by a ridge running from beak to lower pos-
terior angle. 54, 56, 65, 75, 105. *Thracia conradi*.

LAMELLIBRANCHIATA.

Small, white, not very thin; hinge callosity not spoon shaped, ovate-triangular; beaks post. ant. dorsal margin nearly parallel with ventral. 12+6, 12, 7, 130. Interior clear white.

Thracia truncata.

- G Shell equivale and very slightly gaping at ends; not more than 2 c.t. to each valve; $1\frac{1}{2}$ to $1\frac{1}{2}$ times the height equals the length; Animal with long slender siphons; mantle open.

Pallial impression with deep sinus ligament external.

- Ovate-urbiular; muscular impressions distinct, varies much in size, solid from thin to moderate and color from white to bluish or rusty with dark epidermis; very common. 10+12, 17, 9, 135. *Macoma fragilis*.

Var. *fusca*.

Sub-oval, thin, brittle, white, covered with dusky epidermis; ant. end rounded, post. angular; sinus nearly reaching ant. muscular impression; interior bluish white. 14+9, 16, 6, 140.

Macoma tubulosa.

- H Shell equivale; slightly gaping at the post. ends; neither ribbed or spinous; length and height equal; c.t. not over 5.

Small, thin, sub-lanceolate, smooth, pale fawn color, some bluish blotched with dark brown; within shaded or bright yellow, with a purplish blotch at the post. end; epidermis thin and of a darker color. 8+13, 20, 16, 110.

Loricardium mortoni.

teeth

- I Cardinal small, numerous, disposed in a line along the hinge margin.

Oblong-ovate or kidney shaped, smooth pointed in front, broadest and truest at behind gaping at both ends; a rib like

45°. 23+34, 35, 25,
See* page 43

10

6 2

LIBRARIATA.

3. Shell heavy; no lunule; 3 diverging
c.t. in each valve; no sinus.

Oval pit in place of lunule; epidermis of a dark shining brown color inside, chalky white, no purple.

23 60, 75, 45, 120. *Cyprina islandica*.

2. B Shell small to medium in size; in shape, only portion of shell is flattened; with distinct radiating ribs or ridges; not a true bivalve.

- 1 Hinge with a single short strong
tooth under the beak.

- Thick and strong; height greater than length; surface with about 25 concentric, radiating curved ribs which are rendered rough by distinct lines of growth, and covered by a strong rusty-brown epidermis; tunicle deep, rhomboidal; ligament mottled sunken. 1813, 15, 1811, cylindrical & realis.

- Height less than length; about 17 curved ribs; smoothish. 8+14, 18, 12, 12.
- *Cylindroides novaezelandiae*.

2. Hinge with numerous small teeth in
 anterior teeth separated by a diamond
 shaped area; 25-30 radiating lines
 in tooth bed.

- X. Ollong; beaks prominent, directed
very obliquely toward and termi-
nating nearly over ant. end of snout.
st. t. ; Iris dark brown
epithel. 10x52, 40, 120. 3rd + 4th Pa

- Healthy, not very oblique and terminating about over ant. third of eye of ant. leg; 1.5 mm. long but slightly curved. Ant. 2.5, 3.5, 4.5. See pp. 44.

LAM LIBRARIATA.

2. Small; two oblique cts. to each valve; no sinus; no lamellæ.

Fragile, dingy white. About 26 yards
long ribs, these are slightly rounded
and have a series of equidistant, w
ed scales; interior white or flesh color
and flattened to suit the ribs outside.
445, 10, 7, 120. *Cardium pinnulatum*.

Small, thin, rounded oval, regularly convex; lines of growth minute, raised by minute and crowded radiating lines, which increase in number towards the periphery; margin denticulated.

Epidermis brownish-yellow; body a curving, not in contact. This shell fitting to the mouth, and the dimensions refer to the shell in the mouth position. 110, 10, 6, 120. S. A. 110, 45.

6. Shell minute to middling, smooth,
length and height nearly equal; distinct
lamellae.

Minute, dust white, ovate-globose
thing; beak prominent inclined forward;
lunule rounded slightly indented; pro-
cut with a remarkable widened space
which runs near the margin to the
post. base, producing a deep indenta-
tion in the outline; C. 1 in the 1/2.
116, 5, 10, 10. Cry to low, youthful.

[illegible]

LAMELLIBRANCHIATA.

Very minute, elongated and fragile,
semi-transparent, smooth and shining,
pale colored.

blending
into dark purple at the back and
post. edge; common. 12+15, 15, 1, 10.

Curculio minutus

Small, solid, oblique triangular or quad-
rate shaped; base colored not included;
lunule lance shaped, slightly imbricated;
base of lunule slight and slightly wrink-
led; epidermis light yellow with greenish
glaze bluish white; no s.d. in l.v.

12+10, 9, 10. *Astarte quadrata*

Medium, sub-orbicular, thick and heavy,
with slight concentric undulations;
base much pitted, generally covered;
lunule weak lanceolate, deeply im-
bricated smooth and dry beveled.
epidermis chestnut, wrinkled and
stained with black at post. end;
ligament small; l.c. in v.v. 2, 10.
12+19, 25, 17, 10. *Astarte tatarica*

Small, oval to medium, with slight
concentric furrows; ribs on sides
quite very distinct.

1 With distinct lunule and l.c. less
than 2 the each valve.

Small thick and strong, regular,
sub-orbicular, surface with 10-20
strongly developed rounded concen-
tric ribs, one deprived posteriorly
under the s.d. the s.d. is distinct

long narrow

f.c.t. in r.v., 2 in l.v. 12+18, 25.
Astarte undata

Small thick, solid, sub-orbicular

LAMELLIBRANCHIATA.

Small, pointed, inclining much
forewards over a small lanceolate
lunule; surface covered with
remote concentric lamellar ridges,
with several thread like striat bet-
ween them; minute radiating lines
near margin; interior chalky white
except near margin where it is
polished; 2 small c.t. in r.v., 1 in l.v. rare.
16+24, 40, 15, 140. *Lucina filosa*

Orbicular, lenticular, thin, white, glossy;
beaks elevated and slightly inclined
forward; stages of growth strongly
marked and sculptured with regularly
disposed remote and nearly parallel lines
which bend at nearly a right angle from
the centre of the shell and pass oblique-
ly downward towards the ends of the
shell forming teeth around the entire
margin; lunule long and narrow;
1 c.t. in r.v., 2 small in l.v.
13+13, 24, 15, 130. *Cyclas dentata*.

Small, quadrant shaped; ant. margin
straight or concave; about 14 concen-
tric rib like waves, which have minute
regular radiating lines between them;
lunule long and deep; color pale yel-
low-green with dusky markings.
1+1, 7, 3, 85. *Gouldia mactracea*.

Small, white, ovate, higher than long
concentrically striate, much swol-
len in the middle; beaks are prolonged
and turned strongly to the ant. side;
lunule large and sunken, somewhat
flat; ant. border with a prominent
rounded angle; post. side with two
strongly developed flexures separated
by deep grooves; inside with radiating
grooves near the ventral edge.
7+8, 18, 13, 100. See + page 33.

LAMELLIBRANCHIATA.

07

2 Without lunule; c.t. less than 5 in each valve; minute nearly orbicular.

✓

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Three c.t. in l.v., middle one conic triangular, two in r.v.; sinus narrow; ant. end more rounded; ant. end and most of the base white tinged with rose color, post. and upper portion reddish purple; within white except post. which has the purple of the outside; Common. $1\frac{3}{4} + 2, 3, 16, 110$. *Tottenia gemma*,

Post. more rounded; shell somewhat triangular; rather solid; shining straw color; no purple; sinus very small. $1\frac{1}{2} + 1\frac{1}{2}, 3, 16, 95$. *Tottenia manhattensis*.

3. Small to minute; a series of eight or more c.t. in each valve; no sinus; a spoon shaped pit for the cartilage.

Minute, somewhat triangular; oblique globose; 3 ant. t. and 7 post. t. in each valve; epidermis olivaceous; coarse unequal lines of growth.

$3 + 1, 3\frac{1}{2}, 3, 90$. See + + page 43.

Trapezoidal, thin, 8 ant. t. and 4 post. t., post. ones long and slender; interior silvery white but not pearly; epidermis grass green; beaks prominent; no radiating lines.

$6 + \frac{1}{2}, 6, 4, 110$ See + page 44.

Oblique ovate-triangular; ant. end short, 12 ant. and 18 post. teeth, some very small near spoon shaped pit, the series of teeth nearly at right angles to each other; interior pearly; epidermis light olive color, with darker zones. $2 + 8, 8, 6, 85$. See + page 43.

LAMELLIBRANCHIATA.

E Elongated shell, at least $1\frac{1}{2}$ times as long as high, without sinus. Dorsal without siphon; two adductor muscles, each one of the depressions in the back.

Smooth, green or greenish yellow with bluish epidermis; c.t. many to each valve, pit for cartilage opening in series of teeth.

Transversely ovate; margin bluish black straight to tip; lateral surface light green epidermis with dorsal series.

Interior bluish white; c.t. extends $\frac{1}{4}$ of the length of the shell, 22 ant. 12 post. in each valve; cartilage pit small.

20 x 5, 20, 11, 170. *Yoldia limosa*.

Interior pearly white, cavity of cartilage deep and triangular. c.t. 10 x 16 to each valve.

10 x 11, 11, 7, 170. *Yoldia sapidilla*.

Smooth, elongated oval; lateral edge striated concentrically; pale yellow green epidermis; c.t. small 10 x 16 in each valve. 21 x 5, 12, 140.

Yoldia chesa.
Transverse. 7. *Yoldia thracia* form. Oval-lanceolate, produced behind and truncate; pit for ligament on each; surface with concentric striae; greenish yellow epidermis; c.t. 12 x 16 in each valve.

17 x 12, 7, 6, 170. *Yoldia thracia*.

48 x 27. *Muscula proxima*.

48 x 27. *Muscula designata*.

LAMELIBRANCHIATA.

- + From 41 Nucula tenuis.
- ++ From 28 Scapharia transversa.
- +++ From 18 Argina pectata.
- ++++ Area ponderosa.
(in apartment)

2 Triangular to ovate; hinge anterior or nearly so; horizontal lines ascending along most of the posterior border; adheres by a byssus. (Mussel)

Ovate-triangular; beak at ant. end; straight; basal and ligament margin straight; epidermis dark bluish, shell violet beneath; inside smooth with border violet. 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100. Modiola multiplex.

Oblong-ovate, slightly rounded; beak dorsal, very near the ant. end; hinge margin ascending straight for 1/2 the length of the shell, (bent margin arched a little upward) epidermis dark chestnut color, surface roughly marked by lines of growth and minute radiating lines. 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100. Modiola multiplex.

Oblong-ovate; surface with numerous radiating well marked ribs, not concentric or indented lines; epidermis glossy green and yellow, somewhat cloudy; shell silvery white. 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100. Modiola pilosula.

LAMELLIBRANCHIATA.

Rhomboidal to ovate, with numerous radiating striae, in two sections, leaving the middle portion smooth.

Small, thin, long ovate; surface beautifully sculptured with a network of very minute lines of growth and very numerous fine indented radiating lines which are obsolete on $\frac{1}{2}$ of base at centre; epidermis rusty brown; rare. 3+13, 9, 6, angle of margins 45; *Modiolaria nigra*.

Ovate-oval, hinder extremity somewhat lobed; ant. end with about 4, post. with many radiating lines; the limit between the post. lines and the middle smooth portion marked by an elevated ridge passing from beaks; epidermis olive green with chestnut shades, interior brilliantly silvery. 3+21, 15, 10, angle of margins 45.

Modiolaria discolor.

Irregularly oval (heart shaped from front); ant. end with 16 or more ridges, post. with many; epidermis greenish yellow with clouds of olive; within silvery; at ends crenulated. 15, 11, 7, 6, angle of margins 70.

Modiolaria corrugata.

47. *Crenella glandulosa*.


F. Shells with single adductor muscle.

Elongated shell, irregularly flattened, inequivalve, larger valve at

LAMELLIBRANCHIATA.

Ostricidae.

hering;

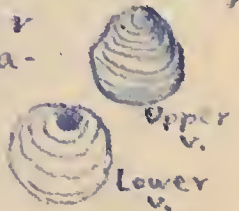
large narrow gradually widening
from hinge end; (the oyster)*Ostrea virginiana.*2 Orbicular; more or less inequi-
valve; hinge line straight 

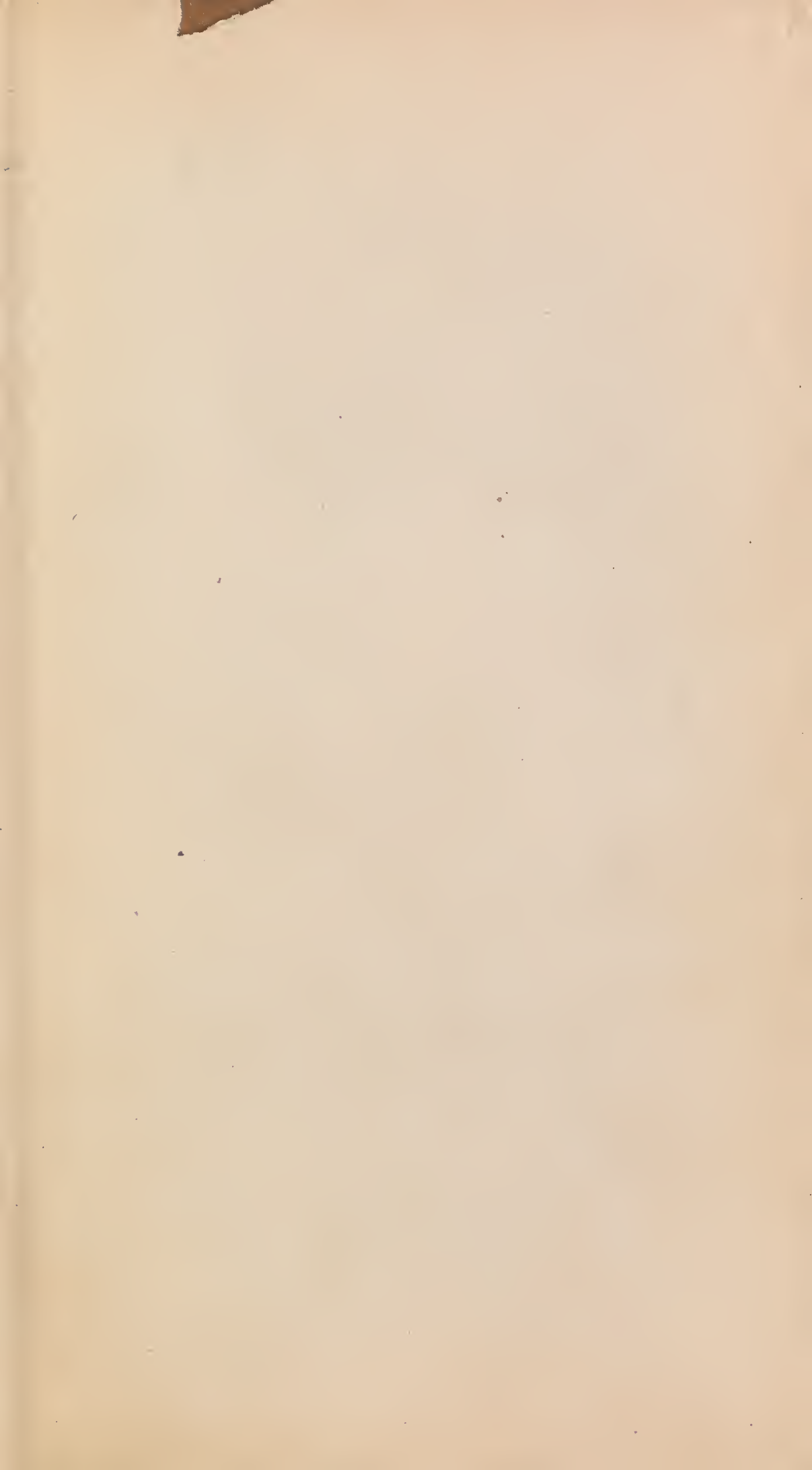
Lower valve nearly flat

and nearly smooth; upper valve
without ribs; diameters about 150,
breadth 35. *Pecten tenuicostatus.*With 50-100 radiating ribs; length
75, height 85, breadth 25.*Pecten Islandicus.*

About 20 radiating ribs, l. 65,

h. 62, b. 50.

*Pecten irradians*3 Orbicular, irregularly foliated,
very inequivalve, under
valve nearly flat, perfora-
ted near the beak for
passage of muscle by which
it adheresSurface rugged, scaly, variously
wrinkled; aperture ovate; beak
not quite reaching margin; pearly;
usually 2 1/2 in diameter*Anomia glabra.*Beak reaching margin; upper
valve with fine prickly radiating
lines; lower valve smooth; aperture
circular; color yellowish white;
diameter 12. *Anomia aculeata.*







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